Factors affecting Hay quality

1. Choice of crop variety

If a forage crop is to be sown with the primary aim of making hay, a suitable variety should be chosen. The sudan grass hybrids Superdan 2 or Sprint and BMR Rocket or BMR Octane, are well suited for this. As not all crops and varieties are equally suitable for haymaking, care should be taken when making the final selection.

Choose the crop and variety that will give:

- The potential yield and quality required
- Rapid drydown (avoid crops with very thick stems)
- Good crop regrowth if required
- Flexibility in time of cutting without rapid quality deterioration. Later flowering varieties give such flexibility.

The choice of crop variety sets a limit on the hay quality that can be achieved, as the hay can only be as good as the forage from which it is produced.

2. Crop growth stage

The quality of forage crops changes over time, as they grow older and taller. The time to cut will depend on the quantity and quality of hay required. Late cutting may lead to a potentially greater yield but the quality be lower.

For maximum quality, cut when crops are still in the young vegetative stage. For example, in the case of forage sorghum, cut when the crop is approximately 1 to 1.3 metres tall. It is best to use a mower-conditioner, which will condition or crush the stems and reduce the drying time. Another advantage of early cutting is thinner stems, which allows easier conditioning, smaller windrows and faster drying.

3. Time of cutting

Does it matter whether the crop is cut in the morning or the afternoon? In recent years there has some work done on this subject, with crops being cut for hay at various times of the day. The hay has then been checked for quality and palatability.

The theory is that plant sugar levels are low in the morning and reach their daily peak during the afternoon. This is due to plants using energy (sugars) during the night for plant respiration. But sunlight activates photosynthesis, which restores the plant's sugar level.

The results to date suggest that there are both quality and palatability advantages from afternoon cutting. However, if the cut crop does not have sufficient time and heat to full wilt before nightfall, it will continue to use up sugars until wilted by the heat of the following day. This negates the intended benefit. In recognising the potential benefits and limitations of current information, the conclusion is the best time of day to cut crops for hay is late morning.

4. Sunshine

There is wisdom in the old saying 'make hay while the sun shines'. As discussed above, there are advantages in cutting the crop when plant sugar levels are relatively high. If a crop is cut during overcast weather or during the night, the plant sugar level will be low. This hay will be less palatable than hay cut during sunny weather.

Sunshine

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Increased plant sugar levels + Rapid wilting

5. Degree of weather damage

The longer hay is drying in the field, the greater risk of rain damage. Early cutting before stems become thick, pls using a mower-condition, will reduce drying time.

6. Moisture content

The moisture content of forage when it is baled, affects hay quality. A high moisture content when baling can lead to hay overheating.

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3. Factors affecting Hay quality

This heat destroys protein, lowers hay quality and can also lead to a fire risk. On the other hand, allowing the crop to dry for too long can result in significant loss of leaf, which is the most nutritious part of the plant. The time of baling is therefore critical.

Forage can be safely stored in a stack or bale, when the moisture content has been reduced to 15-20%. To test moisture, take several stems from the middle of the windrow and twist. If juice appears the hay is not ready to bale.

To obtain an accurate reading on moisture content, use a hay moisture meter. These are electronic devices, with probes for testing moisture either in a windrow on in bales. Table 1 below provides a guide on how dry material should be before baling.

TABLE 1: Guide to moisure content for safe hay storage

Bale Type	Ideal (%)	Maximum (%)
Small squares	18-20	23-25
Large rounds	14-18	20-22
Large squares	12-24	15-18

Table 1 notes:

- *Baling at the maximum moisture percentage will result in some quality and dry matter losses due to the heating and respiration. These moisture contents are approximate only and will vary according to the bale densities and weather conditions (temperature and humidity) in various regions. The higher moisture contents may be used if bales are to be left in the field, where further drying will occur. In high rainfall regions some hay may have to be made with higher moisture content because of the less-than-ideal drying conditions. In these situations, monitor bales for mould and heating during initial storage.*
- *Each of the above 'ideals' could be a bit lower, but significantly increased lead loss will occur. Why do large round and square bales need to be drier at baling? Large round bales have a small surface area to volume ration, compared to small square bales. Large square bales have very high density, which does not allow bales to 'breathe' or lose heat.*

Table 1 and 2 information kindly provided by Mr Frank Mickan, Pasture and Fodder Conservation Specialist, Department of Natural Resources and Energy (DNRE) Ellinbank Victoria.

7. Storage methods

Storage methods will have a large effect on hay quality, particularly with long term storage in higher rainfall regions. Shed storage gives the best protection, but this has to be balance against the cost and availability of shed space, how long hay is to be stored and the value of the hay.

Table 2 provides information on storage losses in round bales with different storage methods. In the worst-case scenario, with 1.2 metre diameter bales stored outside, almost one third of the hay will be lost in on year.

TABLE 2: Storage losses, as a percentage by weight, of round bale hay stored for one year (~750mm annual rainfall region)

Storage method	Bale diameter		
	1.2 m	1.5 m	1.8 m
In shed	8.0%	8.0%	8.0%
Covered stack (plastic sheet)	11.4%	9.8%	9.0%
Plastic wrapped (kept off ground)	14.6%	11.4%	10.0%
Uncovered stack (kept off ground)	26.2%	17.4%	13.4%
Uncovered stack	32.4%	23.8%	19.6%

For more information, please contact Pacific Seeds on (07) 4690 2666 or visit the website www.pacificseeds.com.au

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